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CLASSICAL STUDIES.

I AM not sure that Education is a legitimate topic for investigation and discussion by this Academy. And yet it is both a science and an art; a science of definite principles, well-organized methods, and demonstrable results; and an art of measureless practical importance. But however this may be, the question is no longer an open one, but has been decided for us by the authority of our venerable ex-President, who, at one of our recent meetings, read an elaborate essay, which he has since published, on "Classical and Utilitarian Studies." That Essay, learned, witty, and ingenious, as everything is which comes from his pen, is further remarkable because it is written by an excellent classical scholar, and it contains a sweeping condemnation of Classical Studies, especially when used as an organon of education. As Dr. Bigelow has forgotten more Greek than I ever learned, he will pardon me for saying that he has indirectly and unconsciously refuted himself, since his paper, as appears from the very face of it, could not have been written except by a proficient in the very studies which it condemns. And this Essay has gone forth to the world, not only with all the weight of authority which belongs to its authorship, but with the implied sanction of this Academy, if some voice, however feeble, be not here raised to controvert the doctrine which it teaches.

And what is this doctrine? Speaking briefly, it is, that this bustling and practical age in which we live, — this age of steam-engines, railroads, gas-lights, and Atlantic telegraphs, when the physical sciences are growing with a rapidity that takes away one's breath, and startling us with new wonders every day, — has no time or thought to waste on dead languages, obsolete sciences, or works of literature and art which served well enough to amuse the world when it was in its

infancy. The time has come for the navigator to take a new departure. Efface the record of all that was said or done before the year 1500, or thereabouts. Throw the Greek and Latin classics overboard; abandon even "the intellectual pursuits" of those who wrote them; stick to "utilitarian science and studies, connected with practical, material, tangible, and useful things." "For more than five thousand years, — from the beginning of history, until about three centuries ago, — the human race had made little progress in anything which we now regard as constituting material welfare, or growth in power, knowledge, and means of happiness." "A few of the last generations have not only excelled, but greatly distanced, the collective performances of all those who have preceded them." Abandon, then, "the barren studies" of the olden time; learn "the new philosophy," which dates only from the age of Bacon, and is illustrated by the marvels of modern discovery and invention. A lifetime is too short to acquire an adequate comprehension of what the utilitarian sciences of our own day have accomplished for the world's welfare. Let the dead past bury its dead. And this advice is given not only for the distribution of time and effort by men of mature years, but with especial reference to the education of the young.

This brief summary, given mostly in his own words, shows that Dr. Bigelow's quarrel is not only with the languages, but with "the intellectual pursuits," of the ancients, — with all the sciences and arts in which they peculiarly excelled. His censure strikes not merely their forms of speech, but their literature, their habits of thought, their arts, their logic, and philosophy. It is little that he denies the *educational* value of these things; the present generation, he thinks, can profitably discard them altogether. The world, we are told, has outgrown the Greeks and Romans in all respects. The Essayist traverses the two thousand years of history which immediately preceded the age of Bacon, and finds that all is barren. To him, physical science is everything; the moral sciences are a mere wilderness of words and waste of labor. And even physical science deserves cultivation only so far as it leads to definite and tangible results, and conduces to the material welfare of mankind, — only so far as it facilitates the invention of such things as locomotives, spinning-jennies, and Parrott guns. The Essay might bear as its motto the maxim of Sardanapalus: "Eat, drink, and obtain the maximum of physical ease and enjoyment; the rest is not worth a fillip." Not Dr. Bigelow's original intention surely, but the necessities of his argument, drove him to these sweep-

ing iconoclastic doctrines. He finds it impossible to deery the study of the ancient languages except upon those low utilitarian principles which preclude our finding merit in anything that does not promote physical comfort, or gratify ambition by enslaving outward nature to our material uses. I am glad that it is so. The extravagance of the conclusions is a complete *reductio ad absurdum* of the premises.

The Essayist has overlooked one point, a due estimation of which is essential to any full consideration of the subject. Harvard College has less than four hundred and fifty undergraduates; add those at Williams, Amherst, Tufts, and one or two smaller institutions, and we have, in this State, a total of about one thousand students in College. It might seem that there are about one thousand others in schools and academies, who are pursuing preparatory Classical Studies; but, as less than half of the undergraduate period is devoted to these studies, and not more than two years are spent in acquiring Latin and Greek enough for admission to college, — the remainder of the time being given to mathematics and physical or moral science, — it follows that there are not, at any one time, more than about one thousand or twelve hundred young men in Massachusetts who are studying what are called the dead languages. Our population is over twelve hundred thousand, of whom about one sixth, or two hundred thousand, are, or ought to be, receiving a school education; in other words, one out of every two hundred pupils is, at any one time, studying the Classics. This proportion is probably larger in Massachusetts than in any other State in the Union, and I believe it is quite as large as in any country in Europe, with the possible exception of Germany, where the direct patronage of government fosters these studies to a somewhat unnatural extent.

Then, if asked whether our industrious and inventive contemporaries would do well to intermit their mechanical pursuits in order to study the ancient languages and sciences, the answer is, Certainly not; no sane advocate of Classical Studies expects or wishes the thousandth part of the whole community to do any such thing. But what then? Because not one man out of a hundred thousand needs to become a practical astronomer, we do not therefore break our telescopes and pull down our observatories. The function of the select few is not to be construed into a universal obligation. The real question is, whether those few, — about the two hundredth part of the whole educable number, — who have the time, means, and wish to obtain a *liberal* education, — that is, to give themselves, up to about twenty-one

years of age, to *general* studies, before undertaking the *special* studies of some particular profession, — should be encouraged to devote one fourth or one third part of this training-time to the ancient languages and sciences; and this, not more for their own sake, than for that of the whole community who are hereafter to profit by their scholastic attainments. The Classics have no place in our Primary or Grammar schools; we would not even make the study of them imperative in our Scientific Schools or Technological Institutes, though, for reasons soon to be given, the pupils in the two last would unquestionably be better fitted for their work by the acquisition of a little Latin and Greek. And even in our Colleges, as already explained, less than half of the pupils' time is devoted to these languages.

I am not going to weary you with an attempt even to recapitulate all the grounds of apology (if I must use that word) for Classical learning. The field has been so thoroughly trodden down by the multitudes who have passed over it, that there is not a square inch of green turf left, and it offers but a dreary prospect. Scholars can well afford to rest their case on this single consideration, — that the words and the thoughts of the old Greeks and Romans have been so thoroughly incorporated, so deeply ingrained, into modern language and literature, whether French, Italian, Spanish, or English, that no thorough knowledge or appreciation of these derivatives is possible except by going to the sources whence they were drawn; that this infusion has taken place, even in a greater degree, into modern science, which is so built upon ancient learning, — its precise, far-extended, and ever-increasing nomenclature being almost exclusively Greek, — that, without a tolerable knowledge of that language, it may fairly be said that the student of science, however earnest and capable, knows hardly a word of what he is talking about. Without such knowledge, the lawyer must seem, even to himself, in the names of the writs which he every day draws, and in the phraseology of the legal aphorisms which he is compelled constantly to cite, to be prating a jargon compared with which even Choctaw would be significant and harmonious. Without it, the physician cannot read intelligently a single page of a medical book. Without it, the divine, except by dim approximation and with much blind trust in very fallible human guides, cannot interpret the very title-deeds of man's salvation. Language itself, in its widest sense, not of this or that particular nation, but of the whole human race, — that marvellous work, as I believe, not of man, but of God himself, — with all its intricacies of structure, complex harmonies,

and subtle adaptations to the nicest shades of meaning, cannot be anatomized in structure or unfolded in thought, except by the aid of that special, and yet typical, form of it which was spoken in Attica two thousand years ago. Universal grammar is a science which owes not merely its terminology, but its very being and substance, to the light which the special formations and historical development of Latin and Greek, with their derivatives, have shed upon the structure of all other tongues. It is but an illustration of this general fact to say of English *grammar*, in all its parts, — *orthography*, *etymology*, *syntax*, and *prosody*, — as taught in our lowest public schools, that it is only, as these very words import, an uncouth representative — a sort of bastard child — of the Latin and Greek Accidence. And I believe most practical teachers will bear me out in asserting, that it is never taught with any thoroughness or to much profit, except as a consequent, and not as an antecedent, of the Latin grammar. How could it be otherwise, in view of the very complex origin of our language, its vigorous but somewhat wild development, and the heterogeneous elements of which it is made up? Our noble mother-tongue is alike remarkable for its copiousness, its flexibility, its strength, and its lawlessness. It will acknowledge no rule but

“usus

Quem penes arbitrium est et jus et norma loquendi ;”

it will conform to no analogy ; but its abundant life and luxuriant growth push forth into the most anomalous forms of branch, leaf, and fruit. Nearly forty per cent. of its vocabulary, it has been computed, is Latin or Greek ; and only in the complex but regular structure of those languages, can we find — I will not say a key to its intricacies, but — a criterion and instrument by which we can trace its processes of development and measure its departures from rule.

English literature, too, is so deeply imbued with the spirit of the Classical ages that a large portion of it cannot be read with any enjoyment or intelligent appreciation, except under the light reflected from those stars of a distant firmament. Take Milton, for instance, in either of his two epics or in his minor poems ; and, apart from the gorgeous diction, so redolent of Greece and Rome, you find the very matter and substance of his verses so deeply saturated with the Classical aroma, — so rich with allusions, imitations, and illustrations from the old perennial sources, from Greek and Roman mythology, history, tragedy, and art, — that, take away all recollection of these, and the

poet's coloring fades, his spirit evaporates, and nothing remains but a *caput mortuum*. Even of his "Samson Agonistes," it may be affirmed, that only the framework is Hebrew; the substance, the drapery, the soul within, is pure Greek, — a mere infusion of Sophocles and Euripides. Nearly as much may be said of Cowley, Dryden, Gray, Johnson, Keats, and even large portions of Tennyson, Mrs. Barrett, and other popular bards of our own day. Bacon, rightly or wrongly claimed as the founder of modern utilitarian science, wrote half of his works in Latin, and decanted so much of the Classics into his English prose, even into his most popular work, the *Essays*, as to be well nigh unintelligible to any but a Classical scholar, except in a richly annotated edition. Thomas Hobbes, the true master and exponent of modern utilitarianism and materialism, also wrote Latin nearly half the time, and spent his youth on a translation of Thucydides, and his old age on a metrical version of the *Iliad* and the *Odyssey*. Follow down the line of English prose writers of any note, from Hooker and Bacon to Macaulay and Sir William Hamilton, striking out of each every allusion to the Classics, — every citation from and everything suggested by them, — and what will remain but ragged fragments, alike destitute of coloring, coherence, and beauty?

Dr. Bigelow's *Essay* appears as a further exposition and defence of the theory maintained in his *Discourse on the Limits of Education*, pronounced at the opening of the Technological Institute; and must be viewed in connection also with an able *Lecture on Classical Studies*, published, a short time before, by Prof. Atkinson of that establishment. But the peculiar functions and studies of that Institute, as it seems to me, stand in no need of this indirect advocacy, and will not be promoted by depreciating the quite dissimilar work and office of our American Colleges. The great want of special training in physical science and art, by many who have not the time, means, or taste for a full course of liberal education, was recognized long since by the friends of such education, and was met, over twenty years ago, by the establishment, first at Harvard, and afterwards at most of our New England Colleges, of a "Scientific School," open to all who are acquainted with no language but their own, and who desire to study no other. Following the example thus set, and organized on precisely the same plan, the educational department of the Technological Institute has been created, to meet the wants of Boston, for whose youth it is evidently a great convenience to be enabled to pursue their studies and still to live at home. The design is an excellent one, and every friend of liberal, as well as of

scientific, studies will bid God-speed to the enterprise. But it seems very injudicious on the part of its special advocates to attempt to recommend it still further, by maintaining that a proper College education is worthless, or unsuited to the wants of the age, and a scientific one all-sufficient for everybody. At any rate, is it quite consistent for them, under such circumstances, as soon as they have created a professorship of English language and literature, to proceed to appoint to it a gentleman who has been a most accomplished teacher of Latin and Greek for about a quarter of a century, and to fill nearly every other professorship in the Institute by distinguished graduates of Colleges? Such action is an involuntary confession, on their part, of the truth of the doctrine here maintained, — that, whatever may be said against the utility of Classical Studies, a good proficiency in them is, at any rate, indispensable for obtaining or imparting any competent knowledge of the English language or its literature.

I should not have alluded to this bit of local history, if it did not farther illustrate the importance to the whole community of that course of *liberal* studies, in which the Classics occupy the chief place, — of that comprehensive, systematic, and generous training, enjoyed though it be only by comparatively few, — which no one thinks of seeking elsewhere than in the walls of a College. It teaches the teachers. It breaks down the partitions, and even the jealousies, which would otherwise sunder and impede labor in special vocations. By laying the foundations broad, even if not deep, — by widening the range of our sympathies, as well as of our power of comprehension, — by counteracting the necessarily narrow and narrowing influences of the division of labor when applied to intellectual pursuits, it creates, what here in America, at any rate, we are in sore need of, a literary and scientific public, able and patient always at least to hear, not infrequently qualified to understand, sometimes competent to judge.

And here I need not wander far in search of an illustration, but may find one in the very constitution of this Academy, and an echo in the feelings, as well as the judgment, of every gentleman who hears me. Here, our functions are as unexclusive as our corporate appellation, which might otherwise perhaps appear somewhat sweeping and pretentious. Here, more and more frequently, perhaps, than in any other assembly called together at stated times on this continent, we are reminded of the essential brotherhood of all the arts and sciences; and this truth cannot be felt, as well as understood, anywhere so well as in a society composed in the main of scholars, — of liberally edu-

cated men. I have not sought out the statistics of this subject, as it would be an impertinence to do so ; but I fear not to avow the belief, that more than three-fourths of our number are graduates of Colleges. Neither can there be any fear lest I should seem to be here making an invidious distinction ; since it appears from the proceedings of this evening,¹ as well as from the results of several other meetings which are still recent, that what few honors we have to bestow, our Rumford medals and our elections to office, often fall to the share of the small minority who are more or less self-taught. All the merit which my argument requires me to claim for those of us who have been trained at College is, that our Classical Studies, however little else they may have done for us, have, at least, so far liberalized our minds and increased our power of intelligent apprehension, that we can gladly hear, and to some small extent understand and appreciate, whatever is done to extend the bounds even of the most recondite and difficult science. We cannot make telescopes, probably could not adjust or use them when made ; but we can honor those who have this power, and are thereby enabled to pierce farther into the remote secrets of God's universe than mortal eye ever saw before. Our Latin and Greek, however imperfectly remembered, serve at least to remind us, during the somewhat abstruse and otherwise forbidding expositions and discussions to which we often listen here, that all the sciences, whether they date from Aristotle and Hipparchus, or from this nineteenth century, whether the latest improvements in them come from Italy, Germany, France, England, or the United States, still *speaking a common language*, and that one which we learned when we were boys, and which calls up a rush of pleasant memories. We can hear, not only without flinching, but even with gleams of significance and delight, Prof. Peirce discourse about *quaternions*, *isoperimetrics*, *loxodromics*, and *brachystochrones* ; or you, Sir, of *exogens*, *endogens*, *phyllotaxis*, *epiphytes*, *dichotomous*, *pentágynous*, and *pentandrous* plants ; or Mr. Agassiz, of *digitigrades*, *acalephs*, *gasteropods*, *cephalopods*, *pachyderms*, *echinoderms*, — and other “gorgons and chimæras dire ;” and even Dr. Bigelow, talking Greek in spite of himself, by lecturing about *diagnosis*, *prognosis*, *prophylactics*, *anæsthetics*, *endemics*, *epidemics*, and *sporadics* ; and yet farther, though physical science, in

¹ At this meeting of the Academy, the Rumford Medal was delivered to Mr. Alvan Clark, of Cambridgeport, for improvements made by him in the construction of lenses for refracting telescopes.

the intoxication of great success, has been somewhat encroaching and domineering of late, even logic and *metaphysics* are permitted at least to whisper of *subsumptions*, *epicheiremas*, *sorites*, and the *quantification of predicates*, or of *ontology*, *entelechy*, *noumena*, *apperception*, *teleology*, and *synthetic cognitions à priori*. These, and ten thousand others like them, are not merely intelligible as simple appellatives or single words, with a sort of Classical fragrance about them, but in their composite character they are concise definitions or descriptions, which stir the imagination and the memory, as well as the intellect proper. As quaint old Fuller says, to us "the joints of these compound words are so naturally oiled, that they run nimbly on the tongue, which makes them, though long, never tedious, because significant." But to those who have no tincture of Classical learning, whether addressed to the ear or the eye, they are only sesquipedalian agglutinations of syllables, as little significant as *abracadabra* or *Chrononhotonthologos*.

Any one who should fancy that they are too numerous, cumbersome, and pedantic, or that they might be replaced by pithy English words, may be assured that his education in any one science has not yet reached the *pons asinorum*. These formidable polysyllables are "a kind of short-hand of the science, or algebraic notation;" and without them, the investigator would be as helpless as an algebraist or chemist without his symbols, or an arithmetician without the Arabic numerals. In the last analysis, all science, whether physical or moral, is nothing but skilful classification; and without a curiously compounded nomenclature and terminology, which can be built up only from Latin or Greek roots, classification would be but another name for confusion. And for this use, it does not matter much that most of us retain but a very dim memory of our studies at school and College; as almost numberless compounds can be formed by ringing the changes on a very few elements, a mere smattering of the Classical vocabulary, such as is kept up almost involuntarily by reading common English prose and poetry, suffices to interpret these scientific shibboleths. A very few prepositions often repeated, a small stock of adjectives, also frequently recurrent, and a moderate supply of the most familiar nouns are forged into the keys which unlock every coffer in the treasure-house.

Intelligent companionship, appreciation, and sympathy, such as the scientific associations constituted like this Academy are enabled to afford, through the fact that all the sciences speak what may be called a common language, together with the secret consciousness of the far wider companionship and sympathy which is kept alive by finding this

scientific vocabulary also common to nearly all civilized nations, though in ordinary discourse they use a babel of diverse tongues, furnish an almost indispensable encouragement for persistent scientific effort and research. The greatest need of the *savant* at the present day, especially in the more recondite branches of inquiry, as it seems to me, is the need of an audience. He is in no danger of starving; the age and the country have at least raised him above *that* peril. Books are always at hand, and even laboratories and museums are frequent. But isolate him altogether in his work, cut off his readers and hearers, as Dr. Bigelow proposes to do, first by breaking up the comprehensive scheme of studies at College, where alone one comes to know a little of almost everything, and then by cutting up from the roots the common language of the learned, and you dishearten him altogether; you reduce him first to silence, and finally to inaction.

How important this community of scientific terms among all cultivated languages is to the *savant*, may be seen from the example of the only nation in Europe which seems to be under no necessity of building up its technicalities out of the dead languages. Alone among all modern tongues, the German fully rivals the Greek in its power of forming compounds without limit from native roots; and it has used this power to a considerable extent, by employing such words as *sauerstoff*, *wasserstoff*, *kohlstoff*, and *stickstoff*, instead of oxygen, hydrogen, carbon, and nitrogen. But, convenient at home as such a vocabulary certainly is, and flattering to national pride, it is found to place too great a bar upon their freedom of scientific intercourse with other nations; and hence their list of such terms has never been completed, and it is but in partial use even as far as it goes. So true is it what Homer says, as cited and applied to illustrate this very point both by Plato and Aristotle, that

“By mutual confidence and mutual aid,
Great deeds are done, and great discoveries made.”

Because the sciences in these modern times have been multiplied and enlarged, and the arts increased, Dr. Bigelow argues that any liberal and comprehensive culture of mind, such as is attempted in our Colleges through a course of general studies, has become impracticable. To adopt his own metaphor, as “the educational loaf on which the community is fed” has been so much enlarged, he will not allow to Classical literature even a fragment of the crust. And farther, be-

cause the division of labor has been profitable in mechanical pursuits, he affirms that pupils cannot "undertake to make themselves *competent representatives* of all the various sciences, the literary studies, the languages dead and living, which are now professedly taught in our Colleges and seminaries." Of course, they cannot; but in view of that solidarity of the sciences, which every day's progress is making more evident, the real question is, whether a student can become a "competent representative" of any one science, without that very general culture of mind which is nowhere attempted but in College; or whether any one scientific or literary pursuit would flourish and expand, if each were isolated, none but its special votaries having any acquaintance with it whatever, and these being doomed, like each class of artisans in a big workshop, to spend their lives intellectually in making the eighteenth part of a pin. Dr. Bigelow's scheme of a scientific education begins by depriving the student of the common language of all the sciences, proceeds by leaving him without any scientific public, either at home or abroad, competent to hear and judge his work, and ends by requiring him to mount to the mast-head after he has taken away all the shrouds. Such a scheme might produce a chemist, though I doubt it; but it certainly would not make even the eighteenth part of a man. And yet the Essayist complains of sciolism. Why, the worst sort of sciolism, and one with which we are peculiarly afflicted in this country, is that men assume to be scientific chemists on an amount of general knowledge which would hardly qualify them to be decent apothecaries; or prate about the most difficult problems in geology, before they know enough of botany or zoölogy to pronounce on the character of a single fossil. Yet the starved and miserly training which breeds such pretenders, we are now invited to substitute for the liberal and comprehensive culture, which aims to develop all the faculties, and thereby to "fit a man to perform justly, skilfully, and magnanimously all the offices, both private and public, of peace and war."

I appeal to your own favorite science, Sir. What sort of a botanist is he, who knows nothing of physiology; or how much physiology can he acquire, if he is not something of a chemist; or what is chemistry, if not based on physics; or can one become a physicist, without a competent acquaintance with mathematics; and how much time and labor must be spent on the very elements — the far-extended vocabulary and notation — of each of these sciences, by one whose total ignorance of Latin and Greek obliges him to master them, as it were, mechanically and by main strength, just as he would commit to memory whole

pages of a dictionary? I suspect the first lesson you would assign him in botany would be the first six pages of the Latin Grammar,—to be taken on an empty stomach.

Besides, in the argument we are now considering, it is forgotten that a process of generalization, condensation, and elimination takes place, at least *pari passu*, generally in advance, of every step of progress in science. Often, indeed, the progress consists in this process of “boiling down” the previous results; one general law takes the place of a multitude of formerly isolated facts. Hence it is, as has been often remarked, that an undergraduate in College may now easily acquire mathematical truths and formulas which Newton was ignorant of; he must know more astronomy than Copernicus did, and more physics than Galileo; and he makes these attainments, too, with but half the time and effort which it cost the contemporaries of those illustrious men to rise even to the level of their own day. And if we are to adopt the mode of estimating relative merit which the Essayist coolly applies to the ancients and moderns, acting on the maxim that a living dog is better than a dead lion, it follows that our school-boys are to be preferred over the great discoverers of truth,—the teachers of the world.

Dr. Bigelow affirms that “the world mainly owes its present advanced and civilized state to the influence of certain *physical* discoveries and inventions, of comparatively recent date, among which are conspicuous the printing-press, the mariner’s compass, the steam-engine,” etc. And, in speaking of those great events which are usually considered as marking the origin of *modern* civilization, namely, the Reformation, the exodus of Greeks from Constantinople, and the revival of letters,—two of these, be it observed, being only names for the revival of Classical Studies, especially of Greek,—he still asserts, that “at the root of all these agencies, and deep and far beyond and above them, was the vivifying nurture of utilitarian science.” If so, it is somewhat remarkable that the effect preceded the cause by about a century, since the dawn of modern utilitarian science cannot be placed earlier than the age of Bacon and Galileo, at the very close of the sixteenth century, when the three great agencies in question had been at work about a hundred years.

But let this pass, as I would call attention only to the main doctrine here and elsewhere propounded by the Essayist, which, like Mr. Buckle’s theory, makes civilization itself mainly consist in such things as gas-lights, steam-engines, sewing-machines, photographs,

and vulcanized India-rubber. I reject the definition altogether. Not what men *have*, but what they *think* and *believe*, or, rather, what they *are*, are at once the tokens of their culture and the sources of their strength. Turn a civilized community naked into a wilderness or a desert, and they will be a civilized community still; and their hands, guided by their minds, will subdue that wilderness and turn that desert into a garden. The Athenians, in the age of Pericles, had not one of these *soi-disant* material and tangible means and agents of civilization; but these Athenians, saving only their lack of one element, which originated in Palestine some four hundred years afterwards, were the most highly civilized people the world has ever known; and their works, their arts, their literature, their philosophy, have fed and colored, from within outwards, the civilization of all succeeding times. The men of that age and place are even now

“the dead, but sceptred, sovrans,
Who still rule our spirits from their urns.”

As Sir William Hamilton tells us, “every *learner* in science is now familiar with more truths than Aristotle or Plato ever dreamt of knowing; yet, compared with the Stagirite or the Athenian, how few even of our *masters* of modern science rank any higher than intellectual barbarians!”

After all, have these recent physical discoveries and inventions contributed so largely even to our material well-being, that we can fairly consider them as the glories of modern civilization? Have most of them had any other effect than to feed man's vanity and nourish sterile wonder? Take, for example, one of the most brilliant and striking of the whole number, and one to which abstruse science most largely contributed, — the discovery of Neptune. What matters it to you or me personally, or to any human being, or even to the other members of the solar system itself, that, on its outmost verge, some two thousand eight hundred millions of miles from us, and so hardly perceptible to the unaided vision as a faint dot in the evening skies, there is a planet called Neptune, of which we know nothing whatever, except that it is there, and that it circles steadily at a measurable rate round the sun? I have heard a remark quoted from a queer little girl, who said she was afraid to ask her Sunday-school teacher who Nimrod was, for fear he should tell her, and it would be so useless to know. So I am afraid to ask Prof. Winlock, if he has

recently ascertained, through his big telescope, whether Neptune is still extant in his proper place, or whether he has seceded, — gone off, in a hyperbolic or parabolic curve, never to come back again. I am afraid to ask, lest he should tell me, and it would be so useless to know. Why, if Neptune himself should threaten such secession, I doubt not that the other planets, in solemn congress assembled, would say to him, “Erring brother, depart in peace; it is a matter of profound indifference to us whether you go or stay.”

And then the telegraph. For a year or two, we have all been shouting, at the top of our voices, “Great is the Atlantic telegraph, and Cyrus W. Field is its prophet!” But here, again, we forget to ask what the thing is worth, in the greatness of our astonishment that it should be done at all. Like the fly in amber,

“The thing itself is neither rich nor rare;
But wonder how the devil it got there.”

What has the Atlantic telegraph done for us? It has given us news from Europe less than a day old, instead of the same news ten or twelve days old. But the intelligence does not lose its distinctive character *as news*, through the greater or less time occupied in its transmission. I never heard that news were like eggs, liable, if kept over ten days, to become addled. Let me not undervalue the good sometimes done by the telegraph. It has played an important, even an indispensable, part in the apprehension of John H. Surratt. Once in a great while, it is a tolerable catchpole, an efficient subsidiary agent to the State’s prison and the gallows. By its means, we now have Surratt safe in irons, and can bring him to fair trial; though, at this late day, I suppose, very few persons care whether the miserable wretch is hanged or not.

Because the ancients had none of these things, — no telegraphs, newspapers, chloroform, or lucifer-matches, — it is charged against them that their civilization was narrow and barren, and, “in their domestic habits, they were primitive, destitute, and uncleanly.” This whole accusation may be summed up in the old sarcasm against the Emperor Augustus, that, “with all his splendor, he had no glass in his windows and not a shirt to his back.”

Here is the utilitarian idea of civilization! It does not consist in the might of intellect, nor in the beauty of poetry, nor in the power of oratory, nor in the skill of statesmanship, nor in the graces of

sculpture and architecture, nor in the wisdom of philosophy, nor in the depths of abstract science. No. Civilization — true, modern civilization — consists in none of these things; for, in each and all of them, unluckily, the men of the Periclean and the Augustan age were undoubtedly our equals, if not our superiors. But civilization — the genuine modern article — consists in glass windows and linen shirts. As to the two assertions contained in this sarcasm against the emperor, I may as well mention, in a parenthesis, that they are not more than half-true. Long before the time of Augustus, the Romans had glass enough to stock a modern fashionable apothecary's shop; though they seem to have used it chiefly for bottling, not their medicines or their wines, but their tears. If they did not put it in their windows, it was probably for the same reason that half of the Italians at the present day do not put it there, — because the climate does not require it. I suspect glass windows are an indispensable condition of civilization only in high latitudes. As to the other alleged fact, if having a shirt means, as I suppose it does, wearing linen next the skin, it is singular enough that, within a few years, nearly all of us, for hygienic reasons, have discarded linen, and gone back to the old Augustan dress, — fine wool or silk next the skin. In the sense of this sarcasm, if it has any sense, I doubt whether a single gentleman here present has a shirt to his back. To the Union army, consisting of over a million of men at the close of the late war, I believe Falstaff's account of his own troop was applicable, — that there was but a shirt and a half in the whole company.

Even if it be granted that the glory of modern times is its mechanical inventions, it may well be doubted whether the study of physical science and the establishment of Technological Institutes will lead to their multiplication or improvement. The fact is notorious, that most of these are the results of accident, or have been made by unlearned men, chiefly by ingenious artisans. Even the disposition which seeks for them, and the course of experiments instituted for their attainment, are unfavorable to habits of scientific research; for gold, not truth, is the object in view; and though some general fact or law of nature may incidentally be developed, the mind was not on the watch for it, and it will probably be overlooked or forgotten. If you would train up inventors, educate your sons at the blacksmith's forge or the carpenter's bench, in watch-factories, cotton-mills, or machine-shops. These were the schools in which Arkwright, Watt, Stephenson, Paul Moody, Howe, Hobbs, McCormick, and Goodyear studied. Sir

Humphrey Davy received great laudation for the Safety Lamp ; but it is now known that he was anticipated in it, several years, by a sooty son of the mine, who, at the time, was hardly able to write his name. History has not even recorded the authorship or the date of some most useful contrivances and processes, and has left others in dispute ; such as glass, the mariner's compass, gunpowder, and the printing-press ; probably because their inventors were ignorant and obscure men, who did not even know the worth of what they had accomplished. The very process of invention is often blindly tentative, like hunting for a needle in a haymow ; after you have sought it in vain for a week, there comes along a clown who thrusts his hand into the mow, and pricks his finger with it at the first trial.

Science, it is true, has an office to perform, but generally it is one which is subsequent to the invention, and which consists in explaining the *rationale* of the process, by pointing out the laws of nature through which the result is obtained. But even in this subsidiary function, it is often baffled and lags far behind inventive art. Why should caoutchouc and sulphur, moderately heated and rubbed together, produce that marvellous and most useful compound, vulcanized India rubber ? The chemist does not know ; and he is equally ignorant in respect to many of the processes in metallurgy and pharmacy. Why is cinchona a potent febrifuge ? Ask the Peruvian Indians, who first taught our doctors how to use it.

These facts, if rightly weighed, do not discredit physical science, and certainly are not here cited for that purpose. But they do manifest the pitiable folly — I had almost said the impiety — of measuring the value either of physics or metaphysics, chemistry or philology, by a low utilitarian standard ; of estimating our proper mental food by its casual and indirect results, in fattening our bodies, or pampering our lower appetites and desires. In this Academy, at least, I dare assert that the ultimate object of scientific research is not any external good, but knowledge for the sake of knowing ; and let it be remembered, in behalf of the Classics, that this great truth has at least the verdict of all antiquity in its favor, though it is too often forgotten or slighted in this nineteenth century. It is only a corollary from this maxim, but one specially applicable to the subject of education, to say, that the mere effort to know is of more worth to the individual who makes it than the knowledge acquired. The chief object of education, as it seems to me, is not to multiply inventions, but to develop the intellect and form the character. “The

intellect," says Aristotle, as cited by Hamilton, "is perfected not by knowledge, but by activity." But as Aristotle was an old Greek, whose authority will be disputed, I will rather cite one who is a modern Aristotle, at least in the estimation of his admirers,—the great hierophant of Positive science,—Auguste Comte; who tells us, that "*les hommes ont encore plus besoin de méthode que de doctrine, d'éducation que d'instruction*" [men stand much more in need of the method, than of the matter, of learning,—of education, or the means of drawing something out of the mind, than of instruction, or the means of putting something into it]. Or take the same meaning in Greek, in which form I well know it will best please the Essayist; οὐ φιλοσοφία, ἀλλὰ φιλοσοφεῖν.

Every generation of civilized men inherits the intellectual wealth, the mechanical contrivances, and the useful arts of all the ages and the nations which have preceded it; but the natural wonder and self-complacency with which men view their own achievements, often prevent them from estimating fairly the extent of their patrimony. When the Essayist shouts and claps his hands at the feats of modern science, he may be reminded of the witty reply made by the elder Astor, of New York, who, when mildly reprov'd for not contributing so largely to some public object as his own son had done, answered, "That is not a fair example; *he* has a rich father." Scholars will not admit that the attainments of the Greeks and Romans in practical science and art were inconsiderable, or that their every-day life was meagre, uncleanly, or comfortless. We still teach in our schools and Colleges, essentially in its original form, the geometry of Euclid and Archimedes, and the fundamental principles of mechanics, hydrostatics, and optics, as originally expounded by them. The discovery of the principle of specific gravity by the latter, and its application by him in determining the amount of alloy in base metals, was perhaps the most important single step that was ever taken in physical science; while his writings, and his noted exclamation, that he would move the universe if he could find a fulcrum, show how clearly he understood the mechanical powers. His defence of Syracuse for three years, against the legions of Marcellus, was as marvellous a display of the resources of physical science and mechanical ingenuity in war, as the modern sieges of Sebastopol and Charleston; and his affecting exclamation when the Roman sword had already reached his neck, "Do not efface my diagrams," places his name at the head of the list of the illustrious martyrs of science. Eratosthenes measured

the obliquity of the ecliptic, and a degree on one of the earth's meridians, with an astonishing approach to accuracy, thereby virtually determining the circumference of the globe, though he had hardly any better instrument than a sun-dial. Hipparchus detected the precession of the equinoxes, worked out the doctrine of the sphere, and the first ideas of plane and spherical trigonometry, noticed the parallax of the sun and moon, calculated lunar and solar tables, and predicted eclipses with great accuracy, and by a method which is still in use in the higher mathematics, and of which Whewell says, that it is "not only good, but, in many cases, no better has yet been discovered." Strabo and Ptolemy are still high authorities in geography, the latter having determined the mathematical principles of projection, and constructed maps, charts, and almanacs with great correctness. Hippocrates and Galen are still quoted as in high repute among medical writers, and whole cases of surgical instruments have been found at Pompeii. The Julian correction of the calendar was not perfect, but England had no better till the reign of George II.

In farther support of the conclusion which I seek to establish, I will cite an authority that Dr. Bigelow will surely respect, as it is that of the arch-utilitarian of our times, the acknowledged chief of the clan, and confessedly one of the greatest thinkers, as well as one of the great scholars, of our day; I mean John S. Mill. Speaking of the Greeks, he says: "They were the beginners of nearly everything, Christianity excepted, of which the modern world makes its boast. They were the first people who had a historical literature, as perfect of its kind (though not the highest kind) as their oratory, their poetry, their sculpture, their architecture. They were the founders of mathematics, of physics, of the inductive study of politics, so early exemplified in Aristotle, of the philosophy of human nature and life. These things were effected in two centuries of national existence; twenty, and upwards, have since elapsed, and *it is sad to think how little, comparatively, has been accomplished.*"

As early as the time of the kings, Rome seems to have been as thoroughly drained by common sewers, of marvellous size and solidity of workmanship, as the best of our modern cities. Before the age of the emperors, its magnificent aqueducts, some of them still in use, gave it a better supply of pure water than any modern city had thirty years ago, and better than London has now; while the number and magnificence of its public baths indicate that its inhabitants highly prized the virtue of cleanliness. Their roads were so skilfully and solidly

constructed, that, after being two thousand years in use, their remains still challenge the admiration of modern engineers. Their masonry and brick-work are equal, if not superior, to the best constructions of our own day. The arts of agriculture, ship-building, tanning, and metallurgy were highly developed among them, and they furnished the models of some of our most graceful forms of parlor furniture. Indeed, to one who has strolled through the streets and buildings of Pompeii, and inspected the collections in the Royal Museum at Naples, where the kitchen utensils and contents of the shops of this disinterred city have been brought together, or visited the remains of the magnificent villas that once studded the coast around Baïæ and Cape Misenum, the assertion, that the ancients had made little progress in the useful arts, and that in their "domestic habits they were primitive, destitute, and uncleanly," will appear equally amusing and extravagant. If it be answered that these comforts and luxuries, after all, belonged only to the privileged few, and afford little indication of the number and welfare of the bulk of the people, I reply by pointing to the number and condition of those who are emphatically called the "dangerous classes" in London, Liverpool, Glasgow, and New York, to the dens of filth and wretchedness which they inhabit, and to the social state of three-fourths of the Irish people, and ask, if your boastful modern civilization has much reason to plume itself on the comparison?

I have occupied, Sir, too much of the Academy's time, and far more than would have been necessary, if the question had concerned only the relative merits of ancient and modern literature and science. My object has been to plead the cause not merely of "Classical," but of "liberal studies," — of that broad and generous culture of all the faculties, which is nowhere even attempted save in our Colleges and Universities, and of which Latin and Greek form a large and necessary part, but by no means the whole. Dr. Bigelow's argument seemed to me directed not merely against Classical, but against *all* literature; against, not merely the moral and abstruse sciences, but all science whatever, which does not directly promote man's outward comfort and material well-being; against not this or that special scheme of education, but any comprehensive course of general studies. But in view of some of the ominous tendencies of the age, which are nowhere so fully and darkly developed as in our own land; in view of these materialistic and fatalistic doctrines, which seem already the most popular among students in most departments of natural his-

tory and physical science ; in view of the accursed thirst for gold, and the frenzied passion for luxury and ostentation, which are debasing the morals of industry and commerce, and corrupting the tone of our politics, till many have come almost to despair of the republic ; in view of the ignominy of some of our large municipal governments, and the want of either character or ability in our Congress, it seems to me, that he who attacks the cause of liberal education, and thereby so far tries to lessen the number, diminish the influence, and benumb the powers of that class of independent, educated, and thoughtful men, who alone are competent, humanly speaking, to resist these debasing tendencies and uphold the cause of integrity, learning, and truth, is, in fact, though unwittingly, striking a death-blow against the chief agencies and supports of American civilization.

APPENDIX.

THE ABUSE OF THE STUDY OF GRAMMAR.

IF a tolerable proficiency in Latin and Greek could be acquired only by devoting eight or ten wearisome months exclusively to studying the grammar of each of these languages, I should not have a word to say in defence of Classical learning. Such an employment of time appears to me not only injudicious and unnecessary, but almost sinful. It seems of late to have been forgotten among us, that grammar at best is only a subsidiary science, a knowledge of it being valuable not for its own sake, but as a key to the meaning and structure of sentences, and thereby a necessary introduction to literature. Formerly, we studied grammar in order to read the Classics; nowadays, the Classics seem to be studied only as a means of learning grammar. Surely a more effectual means could not have been invented of rendering the pupil insensible to the beauties of the ancient poets, orators, and historians, of inspiring disgust alike with Homer and Virgil, Xenophon and Tacitus, than to make their words mere pegs on which to hang long disquisitions on the latest refinements in philology, and elaborate attempts to systematize euphonic changes and other free developments of stems and roots. The Germans have corrupted philology as well as philosophy by their ponderous metaphysics; and their latest theories and technicalities have been imported into our school grammars, an acquaintance with them being made a condition precedent to admission to College. A foreigner would make slow progress in learning to read English, if he should begin with Horne Tooke's *Diversions of Purley* as a text-book. Yet our grammars have swelled to their present inordinate size in order to include much which perfectly resembles the speculations of Horne Tooke, except that they have not the faintest claim to be regarded as "*Diversions*." Andrews and Stoddard's *Latin Grammar* covers about four hundred closely printed pages, in type so fine as to be injurious to the eyesight; Hadley's or Crosby's *Greek Grammar* contains nearly as much. Instructors complain, and with some reason, that the candidates whom they offer for admission to College are liable to be *conditioned*, as the phrase is, or declared to be insufficiently instructed in grammar, to the great injury of their teacher's



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reputation, if they have not committed to memory, and been thoroughly drilled in explaining and applying, every paragraph of this vast collection of grammatical theories and niceties.

Over thirty years ago, a small abridgment of Mr. Edward Everett's translation of Buttmann's Greek Grammar, comprising, to the best of my recollection, not more than one hundred and eighty openly printed pages, was accepted as a sufficient qualification for admission to the Freshman class; and the amount of Latin Grammar required was proportionately small. Yet, at that period, the quantity of Latin and Greek studied by undergraduates was at least one-third more than what is now required of them. That this amount was not, in one sense, so *well* studied then as now,—that is, that the student did not acquire so much minute philological information,—may be readily admitted. But in the ability, at the time of graduation, to read and enjoy the Latin and Greek authors, he was considerably in advance, as I believe, of our recent graduates. He had command of a larger vocabulary, had profited by more experience in disentangling difficult constructions, had stored his memory with a larger number of pithy phrases, gnomic sentences, and scraps of verse, and had been less injured by the indiscriminate use of *translations*. Classical learning seems to me to have steadily declined in this country of late years, in respect both to the number of its votaries and to its estimation with the public at large, just in proportion as its professors and teachers have diminished the time and effort bestowed on reading the Classics, in order to enforce more minute attention to the mysteries of Greek accentuation and the metaphysics of the subjunctive mood. He will do most to revive it who shall be the first to publish, in a volume of not more than three hundred openly printed pages, *all* the grammatical forms and principles *both* of the Latin and Greek languages which are required to qualify a candidate for admission to College, and which will suffice even for the undergraduate studies of nine-tenths of the students. Those who are ambitious to become Scaligers, Bentleys, or Porsons, may study the whole of Andrews and Stoddard or Zumpt, Krüger or Buttmann.